

have to be called into use in England) these corporations are not allowed to make money by engaging in commercial pursuits or the keeping of boarding-schools. (3) The appointments are graduated in value from 80*l.* to 400*l.* per annum. (4) New members are chosen in any one corporation by co-optation. The promotion of existing members is effected by the same process—one corporation often inviting a member of another to leave his old associates in order to enjoy an increased salary, or increased facilities for research. This co-optation is carefully supervised but not directed by the State Government. (5) Since commercial operations, such as the acquirement of a large revenue by any corporation from the fees of pupils or wards committed to its care, are out of the possibilities of the case—the sole motive which affects the various corporations in their choice of colleagues is a desire to secure colleagues of eminence in the avocation which is assigned to the corporations, namely, research, and in this way to maintain a high reputation for the corporation and congenial association for its members. (6) The result of this is, that the whole stimulus which the prospect of a step-by-step accession of income from 80*l.* to 400*l.* or 600*l.* per annum can bring to bear upon the nature of man is constantly at work in urging those who enter upon this career to give their full energies to research, and research alone. The habit of research so stimulated and fostered, remains even after a career of twenty or twenty-five years—the length of service which entitles the German professor to retire upon full pension.

The enormous fertility of Germany in all kinds of research is the outcome of this simple and healthy system. There does not appear to be any reason why a parallel system applied in this country should not produce parallel results. E. RAY LANKESTER

#### QUAIN'S ANATOMY

*Quain's Elements of Anatomy.* Eighth edition, edited by Dr. Sharpey, Dr. Allan Thomson, and Mr. E. A. Schäfer. Two Vols. (Longmans, Green and Co., 1876.)

THE seventh edition of Quain's "Anatomy" appeared nine years ago under the conjoint editorship of Dr. Sharpey, Dr. Thomson, and Dr. Cleland; in the eighth Mr. E. A. Schäfer's name is found on the title page instead of that of the last-named anatomist. The new edition contains much new matter, and with a larger as well as a clearer type, covers nearly an extra hundred and sixty pages.

The arrangement of the subject-matter is considerably modified in the direction of improvement; the descriptive account of the bones, joints, muscles, vessels, and nerves, together with the surgical anatomy, occupying the first volume; the second, containing the general anatomy or histology, the structure of the different viscera, the organs of special sense, and the embryology.

A much-needed advance has been made in the sections devoted to osteology and myology, which consists in the introduction of paragraphs on general morphology. Teachers of anatomy are too apt to entirely neglect those great strides that have been made in zoology, many of which have an important bearing upon the way in which the human skeleton and soft parts should most

certainly be regarded. We, upon this view of the question, are therefore glad to find among other innovations, a classified list of the bones of the head, and their typical component parts, the nomenclature adopted being that employed by comparative anatomists.

The introduction of nitrate of silver, osmic and chromic acids, logwood, &c., as adjuncts to histological manipulation, as well as the efforts of many able investigators, have rendered corresponding changes necessary in the sections of the work devoted to the microscopic structure of the tissues and organs; and Mr. Schäfer has here introduced several fresh illustrations, and much new matter, which makes the "general anatomy" by itself an invaluable summary of the most modern aspect of histology. The development of blood corpuscles, the ground-substance of connective tissue, the ultimate nature of muscle, the serous membranes and their lymphatics, have received the greatest additions in this portion of the work.

Dr. Allen Thomson has entirely re-written the chapter on embryology, having embodied all the more recent results in this rapidly advancing department of biological science, arrived at by Foster and Balfour, Parker, Mihalkovics, Waldeyer, and others. The whole forms a most excellent account of human embryology, as far as it can be known from the incomplete direct, and the much indirect evidence which can be brought to bear upon it.

The editors acknowledge the assistance of Dr. Gowers, Assistant-Physician to University College, in the revision of the paragraphs on the Cranial Nerves; and in the chapter on the Brain and Spinal Cord, Dr. Gowers has introduced a valuable account of the cerebral convolutions, together with some excellent drawings, more elaborate than those of Ecker. The nature of the many layers of the cerebral cortex is fully discussed, at the same time that a careful abstract of the terminology of Meynert is given, with additional figures.

There is one minor zoological error which we have not seen corrected in any anatomical or physiological textbooks. It is in the nomenclature of the animals with peculiarly small blood-discs. The "Napu Musk Deer" is said to possess the smallest blood corpuscles of all mammalia. It is now known that the Musk Deer has no special kindredship with the Chevrotains, or Tragulidæ, to which group the Javan Chevrotain (*Tragulus javanicus*), which formerly went by the name of the "Napu Musk Deer," belongs. A reference to Mr. Gulliver's more recent paper<sup>1</sup> also shows that in the Indian Chevrotain (*Tragulus meminna*) the discs are equally minute.

With reference to the typography we think it much improved in all respects, but of the figures we cannot help remarking that sufficient care has not been taken by the printers in doing justice to the artists or the engravers. Several of the older woodcuts are, no doubt, much worn, but they, as well as the more recent ones, are printed much too black, considerably darker than in the previous edition.

#### OUR BOOK SHELF

*Exercises in Electrical and Magnetic Measurement.* By R. E. Day, M.A. (London: Longmans, Green, and Co., 1876.)

MR. DAY'S little book on Electrical and Magnetic Measurement seems to us likely to be of considerable

<sup>1</sup> Proc. Zool. Soc., 1875, p. 492.

service both to teachers and to students. The best proof of knowledge of any branch of physics, and the most practical result of the study of any such branch is the acquisition of the power of applying numerical calculation to every question where a numerical result can be obtained. The student knows that he understands a subject thoroughly when he can write down numbers to express definitely the amount of every effect observed and measured by experiment. The importance of numerical calculations in absolute measure is becoming daily more and more appreciated: and in the best English text-books numbers expressing quantities in absolute measure are now to be found, instead of the relative numbers that were alone obtainable from the text-books of only a few years ago. Mr. Day's book brings very fairly together such questions as are likely to present themselves to the student of electricity and magnetism. Anyone who has acquired sufficient knowledge to work through a considerable part of the exercises cannot fail to find them extremely useful.

We have observed some slips that ought to be corrected in future editions. Among them may be mentioned some of his exercises on the tangent galvanometer. No practical experimenter would think of using the tangent galvanometer in such a way as to bring the deflection to  $89^{\circ} 30'$ , as Mr. Day does in Ex. 23, p. 47, or to the high numbers that he refers to elsewhere. We find readings of Thomson's reflecting galvanometer given in degrees, minutes, and seconds. This seems rather absurd, to say the least of it. In a few of the exercises, as in Ex. 9, p. 33, the data are insufficient.

A few more definitions would, we think, be found useful. Some of the terms employed are uncommon, and some appear to be used somewhat ambiguously. Thus in Ex. 2, p. 17, the word *density* is wrongly used for quantity. Again *density* of an electric current is a term so unusual that some explanations regarding it seem all but necessary. The definition, given in Ex. 2, p. 72, as Bunsen's definition, appears a very incomplete one. According to it, a current of unit density is a current of unit strength passing through a voltammeter between two electrodes each one square millimetre in diameter; and, from this it would follow, we presume, that the so-called density of the current is the same at every part of the voltammeter and independent of the form of the voltammeter. If so we cannot think of any possible use of such a name. The terms Farad and Weber, given by some of the practical electricians seem to be used indifferently in more senses than one. It is simply unpardonable, in the present state of the science, to introduce ambiguities of language.

On the whole, however, we are much pleased with Mr. Day's little book, and can warmly recommend it both to teachers and to those who are studying electricity and magnetism without the aid of a teacher.

*Geological Survey of Victoria. Prodrômus of the Palæontology of Victoria.* Decade 3. By Frederick McCoy. (Melbourne.—London: Triebner and Co., 1876.)

WE are glad to find that in spite of the unpromising news which has recently reached England concerning the present condition of the Geological Survey of Victoria, the palæontological work, which is in the hands of such a well-tryed and indefatigable naturalist as Prof. McCoy, continues to make satisfactory progress. The present decade of the *Prodrômus* is of more than local interest, containing as it does interesting new details concerning Owen's marsupial lion, the *Thylacoleo carnifex*. The result of Prof. McCoy's examination of more perfect specimens than those on which the first description species was based, is to suggest modifications in some of the views published by Prof. Owen, but to add confirmation to that author's main position concerning the carnivorous habits of the animal, a conclusion which was called in

question by Dr. Falconer and Prof. Flower. Scarcely less interesting at the present time is the illustration and description of a species belonging to the sub-genus of *Nautilus*, known as *Aturia*. A similar form has been found by Dr. Hector in New Zealand, but in rocks of far older date, and the facts which have already come to light concerning the distribution in space and time of this remarkable genus are such as to invest it with the very highest interest both to the geologist and biologist.

On similar grounds the new species of Tertiary *Trigonia* and *Pleurotomaria*—genera which were so abundant during earlier periods of the earth's history, but which, except in Australia, appear to have become almost wholly extinct at the close of the Mesozoic epoch—are especially worthy of the attention of the palæontologist. The other new forms illustrated in this decade, including a number of Trilobites and Tertiary Mollusca, do not call for any special remark. Prof. McCoy's scientific descriptions are admirably clear and exact, and his general remarks on the relationships and distribution of the species very valuable and suggestive. The engraving and printing of these decades afford evidence alike of the progress made by our Australian colonies and the liberality with which scientific research is supported in them. The plan of publication by decades, illustrating the palæontology of the countries geologically surveyed, was commenced in the United Kingdom by Sir Henry de la Beche, and has been followed both in Canada and India. The decades of the Victoria Survey are quite worthy to take rank, both as regards matter and form, with those of either of the older surveys we have mentioned; and higher praise than this it would scarcely be possible to add.

## LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

### Scientific Poisoning

FOR giving instruction to *one person* in the art of poisoning without detection, the medical student, Vance, is undergoing the very lenient punishment of eighteen months' imprisonment. What would be the appropriate penalty to inflict upon the responsible editors of newspapers who initiate the *public generally* into Vance's secret? CHEMIST

### Pyrology—Quantitative Analysis by the Blowpipe

THE estimation of constituents in compounds by the blowpipe has been hitherto, as is well known, limited to the process of metallic (or, in the case of cobalt, arsenical) reduction of oxides, &c., and that with regard to a very few metals only. I now propose to inaugurate a new plan, by which this rapid, elegant, and accurate method of analysis may (apparently) be applied far more generally, and, as I hope, successfully. In my published work "*Pyrology, or Fire Chemistry*," I have, with the exception of a few indications (as in the case of the insoluble balls formed by lime in boric acid), confined myself to qualitative research only, but many methods will suggest themselves to the attentive student of that book, by which qualitative may be readily extended to quantitative examination.

I propose to proceed more in the direction of a kind of *volu-metric analysis* than of analysis by means of the successive *separation* of constituents, as in the "*wet way*," and I trust that the consideration usually accorded to novelty and the difficulties always inseparable from useful novelties will not now be refused by scientific Englishmen to my feeble initiatory researches, especially as I am (I believe) the first Englishman who has published much *original* matter on this subject. It seems likely that the operator who can, by reason of the *rapidity* of his methods, obtain the *mean* of a number of approximate analyses of a particular substance in the same or less time than that required by the employer of an abstractedly more correct but practically more